TECHNOLOGY NEEDS/OPPORTUNITIES STATEMENT
REMOTE/ROBOTIC TECHNOLOGIES FOR CDI

Identification No.: RL-DD034
Date: August 2001
Program: Decontamination and Decommissioning
OPS Office/Site: Richland Operations Office/ Hanford Site
PBS No.: RL-CP01
Waste Stream: Remote Operations for LLW Debris (ER-05, risk = 4), MLLW Debris (ER-02, risk = 4) and TRU Debris (T3-ER, risk = 5)
TSD Title: N/A
Waste Management Unit: N/A
Facility: Materials processing facilities (five processing canyons)

Priority Rating: This entry addresses the Accelerated Cleanup: Paths to Closure (ACPC) Priority:

_X_ 1. Critical to the success of the ACPC
____ 2. Provides substantial benefit to ACPC projects (e.g., moderate to high lifecycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays)
____ 3. Provides opportunities for significant, but lower cost savings or risk reduction, and may reduce uncertainty in ACPC project success.

Need Title: Remote/robotic technologies for access and deployment of tools and equipment for size reduction, waste emplacement, void space filling, and some dismantling.

Need/Opportunity Category: *Technology need* - there is no existing or currently identified technology for some portions of the facility.

Need Description: Remote technology is needed for access and deployment of equipment and tools throughout the 221-U Facility. Some areas cannot be reached using conventional methods or personnel. Remote systems are needed for entry, size reduction, dismantlement, void space filling, and waste emplacement. Size reduction and void space filling will be needed during facility operations if the facility is used for waste emplacement. Remote capabilities may also be required for void filling and waste emplacement exterior to the facility. However, it is assumed standard burial practices will be used.

Schedule Requirements:
Earliest Date Required: 3/31/2002 for waste encapsulation
Latest Date Required: Unknown for waste encapsulation

Problem Description: Robotic platforms are required for waste emplacement, void filling, dismantling and size reduction in areas of the 221-U Facility where manned entry is not possible.

The canyon deck is covered with extraneous equipment received from other facilities. The transport of equipment of any size through the canyon facility is very difficult if it has to be done on the canyon deck. The cells are congested with piping and vessels, and the hot pipe trench is very congested with small diameter piping. Waste emplacement and void filling may be performed under current facility conditions.
Benefit to the Project Baseline of Filling Need: Personnel exposure should be reduced, and time and cost should be reduced.
Functional Performance Requirements: The remote technologies must function in a highly radioactive environment (up to 500 R/hr, more typically up to 10 R/hr), process chemicals, acids, and caustic solutions. Deployments are required in highly congested areas such as the cells. See the general information section for additional description of the 221-U Facility.

Any crane deployable manipulator system must be integrated with characterization, sampling, and other tools defined as needed in order to support the record of decision (ROD) process and beyond (e.g., waste emplacement, volume reduction, and void filling). The system must have a significant payload capacity (>200 pounds), be easily maintainable, have readily replaceable parts, be operable by facility personnel, and have the ability to accept new tools (end-effectors) as new needs are identified in the facility. It must be deployable on one of the 10-ton auxiliary hoists, and work in concert with the 75-ton crane. Controls for the system must be operable from the confined space crane cab or from the operating gallery.

WBS No.	***TIP No***.
1.4.03.3.1.04.05.03.01.41.03	N/A

Relevant PBS Milestone: PBS-MC-030

Justification for Need:

Technical: Waste emplacement, void filling, and size reduction would be needed if the facility were used for waste emplacement. Dismantling capabilities may be needed for both the characterization and operational phases.

Regulatory: Final disposition of the 221-U Facility will be determined by a quantitative and qualitative analysis based on the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

Environmental Safety & Health: Remote capabilities will result in reduced worker exposure, reduced contamination spread and the ability to perform functions in areas that cannot be reached with the current baseline technologies.

Cost Savings Potential (Mortgage Reduction): Rough order of magnitude (ROM) life cycle cost (LCC) savings of up to $70M (based on the potential costs and savings identified in DOE/RL-2001-29 Draft A). A Record of Decision (ROD) will determine the disposition of the 221-U Facility. A decision to reuse all Hanford materials processing facilities as a waste disposal site could result in a potential cost savings of approximately $70M. Meeting this technology need will support obtaining a ROD.

Cultural/Stakeholder Concerns: Improved protection of the environment and of public health and safety.

Other: There are five main processing facilities on the Hanford Site, two at Idaho, and one at Savannah River. Technologies that meet needs at the 221-U Facility will be applicable at these and other similar DOE facilities.

Current Baseline Technology: The 221-U Facility canyon deck is a respirator area, so personnel access is allowed. Manned operations would be considered the baseline technology. The process cells, ventilation tunnel, and hot pipe trench are prohibitive for personnel access. In those portions of the facility there is no current baseline technology.

End User: Waste Management Project, Environmental Restoration Project, Facility Stabilization Project

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